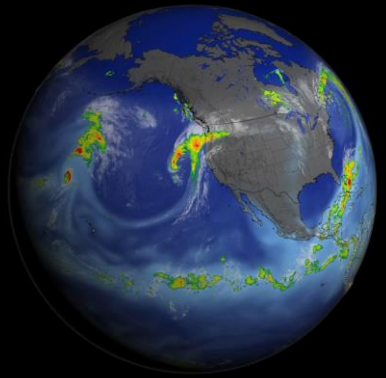
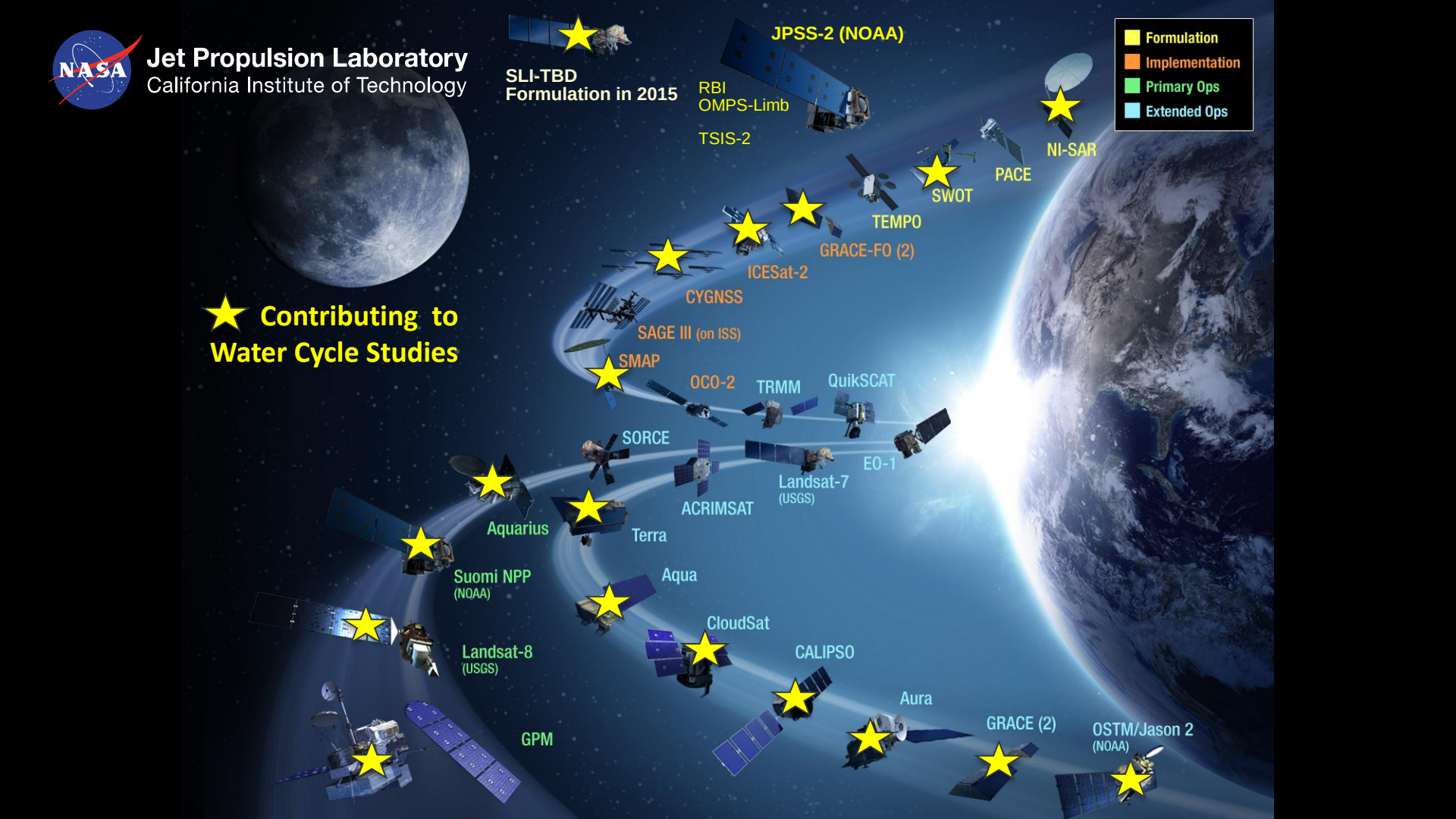


# Observing globally, to study regionally, to act locally

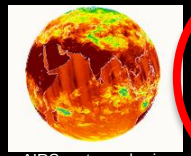
Michael Gunson

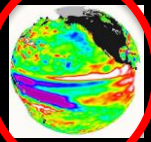
Jet Propulsion Laboratory
California Institute of Technology

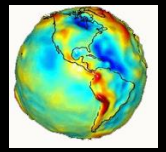

Jet Propulsion Laboratory
California Institute of Technology
SLI-TBD
Formulation in 2015
JPSS-2 (NOAA)
RBI
OMPS-Limb
TSIS-2
NI-SAR
PACE
SWOT
TEMPO
GRACE-FO (2)
ICESat-2
CYGNSS
SAGE III (on ISS)
SMAP
OCO-2
TRMM
QuikSCAT
SORCE
EO-1
Landsat-7
(USGS)
ACRIMSAT
Aquarius
Terra
Suomi NPP
(NOAA)
Aqua
CloudSat
Landsat-8
(USGS)
CALIPSO
Aura
GPM
GRACE (2)
OSTM/Jason 2
(NOAA)
Formulation
Implementation
Primary Ops
Extended Ops
Contributing to
Water Cycle Studies

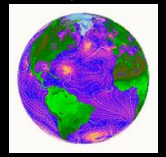
Jet Propulsion Laboratory
California Institute of Technology

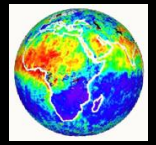
## Satellites

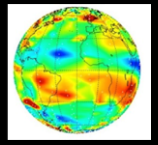

AIRS – atmospheric temperature

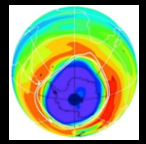

JASON – sea surface height

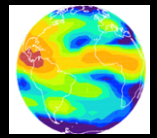

GRACE – gravity

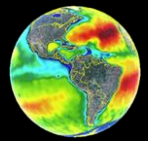

QUIKSCAT – wind

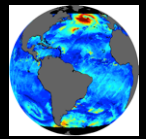

MISR - aerosols

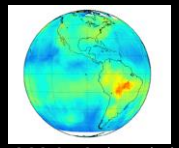

TES – trace gas


MLS – ozone layer


CLOUDSAT – water content

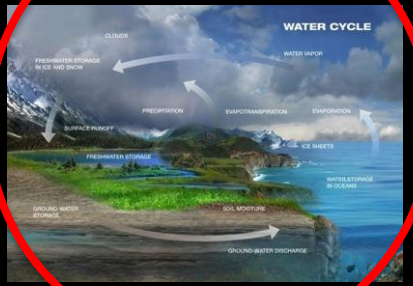

Aquarius - sea surface salinity


RapidScat – wind


OCO-2 – Carbon Dioxide

How are carbon storage and biodiversity changing?


Will water availability change in the future?

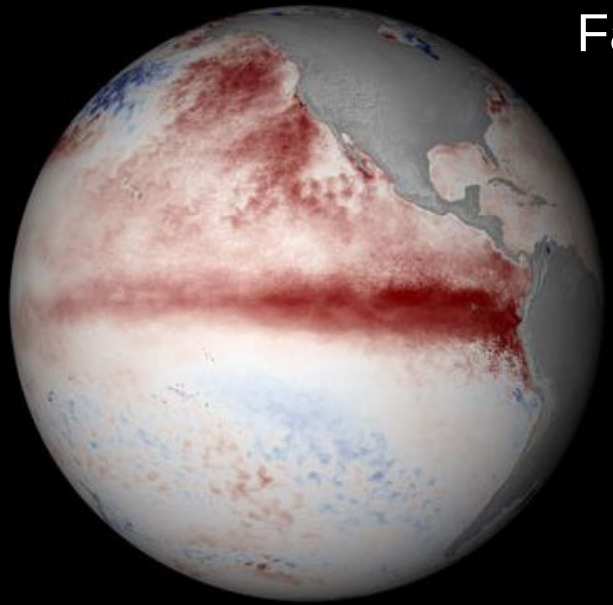



Will sea level continue to rise at the current rate?

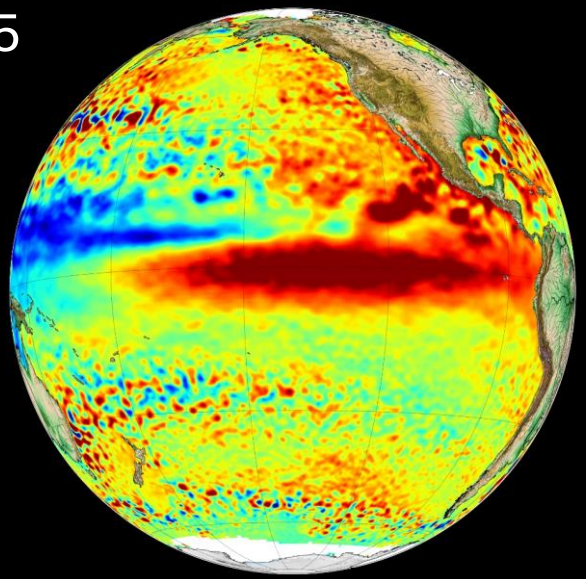

How can we better prepare for extreme events such as earthquakes, floods and volcanoes?

# The Oceans: Where weather happens

Fall 2015

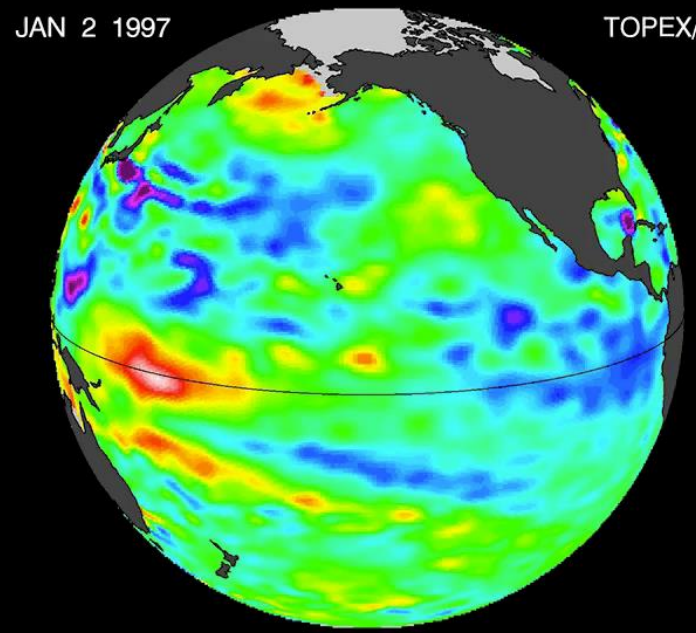


*Ocean Surface Temperature*

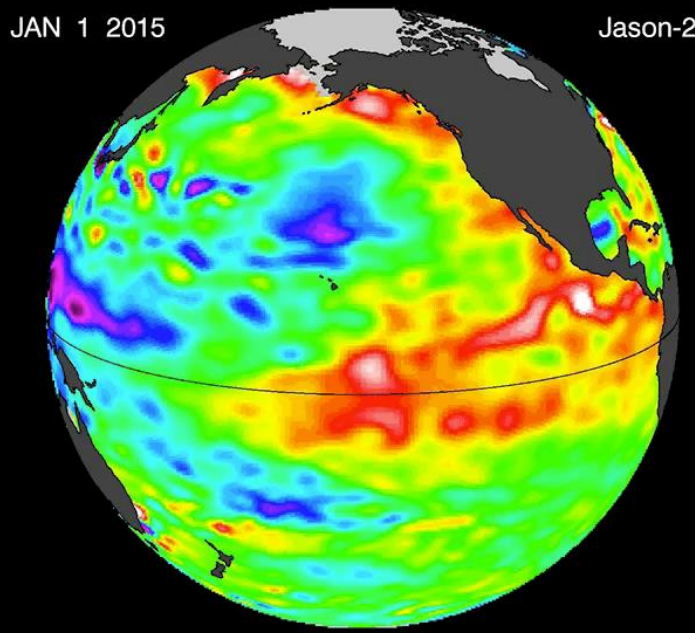


*Ocean Surface Sea Level*

# Sea Level 1997/8 and 2015/6




TOPEX/Poseidon 1997-1998

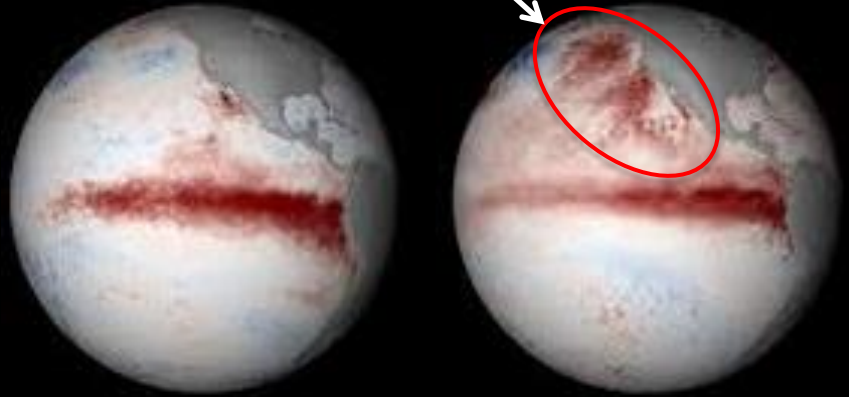



Jason-2 2015-2016

# Why was the forecast for 2015/16 only partially right?

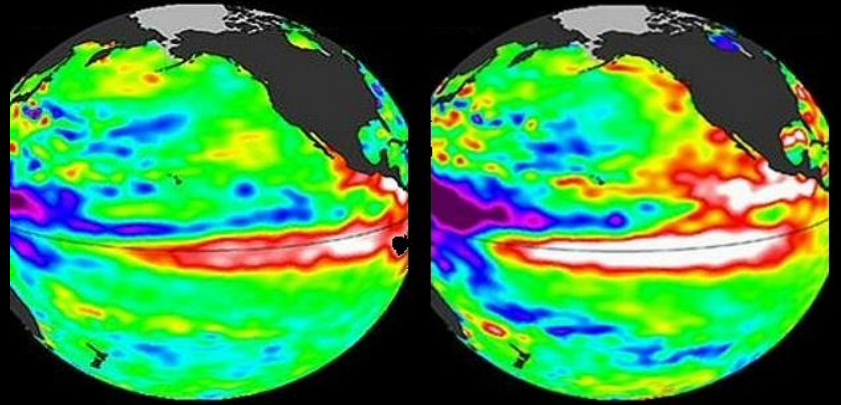
*Was it the “blob”?*

1997 2015



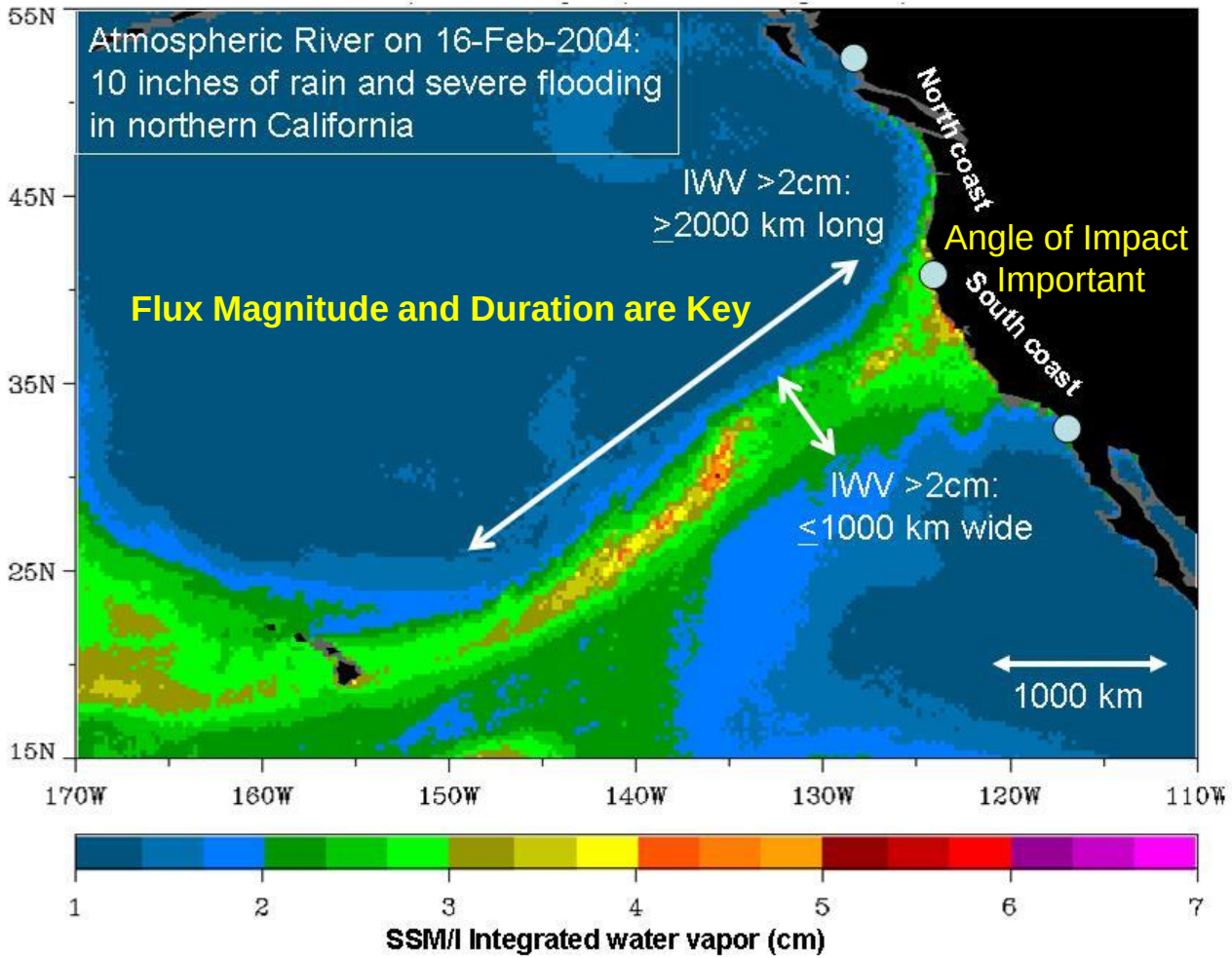
*Sea Surface Temperature*

1997 2015



*Sea Level*

Research underway to understand the observed patterns and learn to better predict them for the next El Niño


Atmospheric River on 16-Feb-2004:
10 inches of rain and severe flooding
in northern California
IWV >2cm:
≥2000 km long
Flux Magnitude and Duration are Key
IWV >2cm:
≤1000 km wide
North coast
Angle of Impact
Important
South coast
1000 km
55N
45N
35N
25N
15N
170W
160W
150W
140W
130W
120W
110W
1
2
3
4
5
6
7
SSM/I Integrated water vapor (cm)

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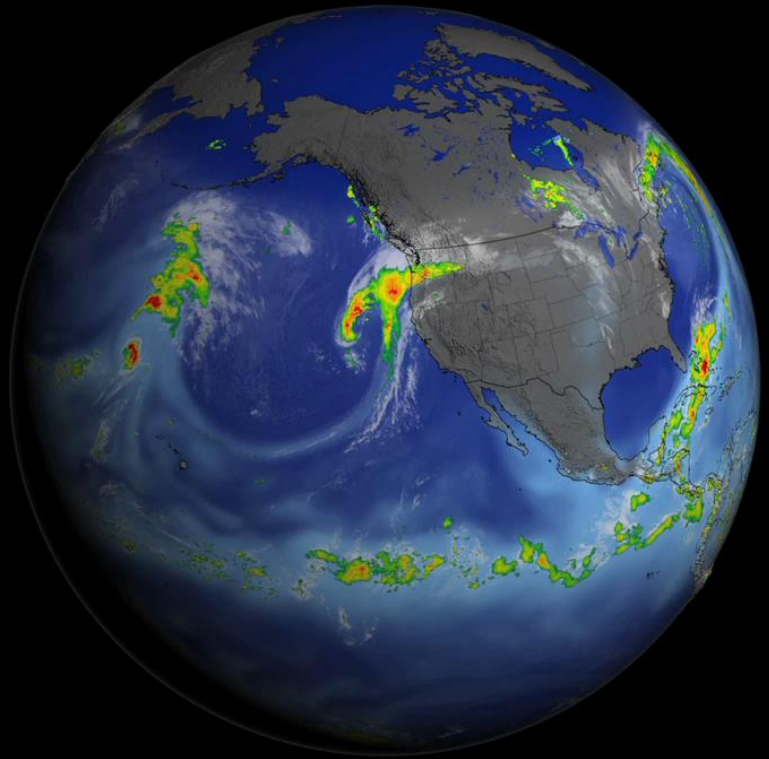
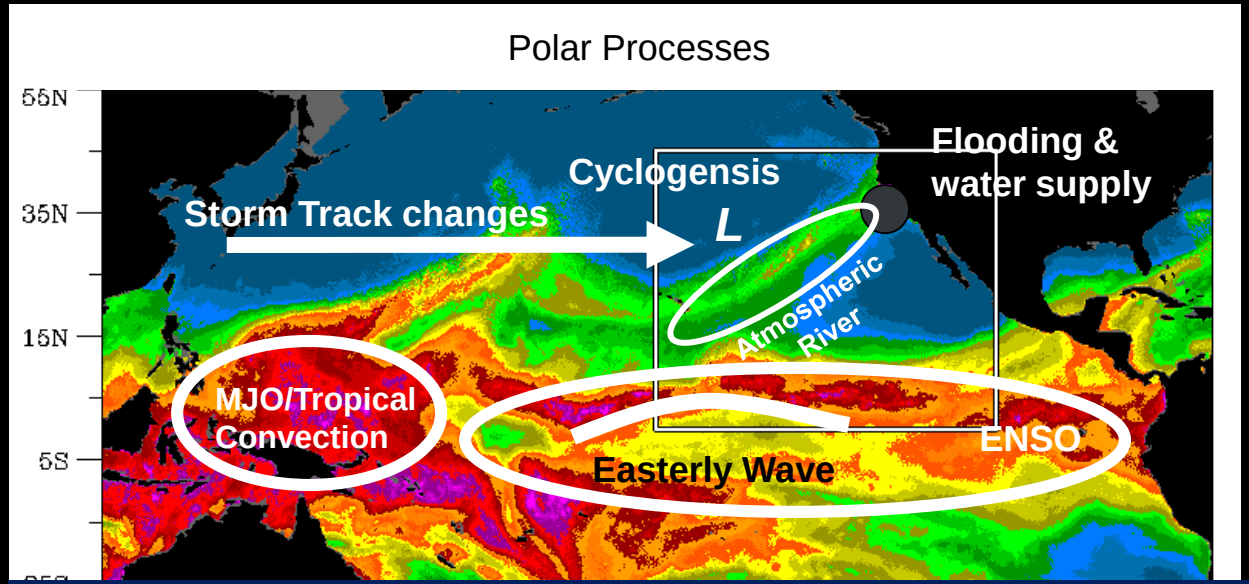


Oct 25, 2014




**The size, number, and strength of atmospheric river events (ARs) result from the alignment of key processes**

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- NASA has an created a “golden age” of satellite observations for Earth Science
  - http://climate.nasa.gov
  - “Earth Now” app (recommended!!)
- Can observations help improve predictions seasonal storm events (frequency and intensity)?

*THANK YOU!!*


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